

A RANDOMIZED CONTROL STUDY OF MASS CLOSURE VERSUS LAYERED CLOSURE OF LAPAROTOMY WOUNDS

General Surgery

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ABSTRACT

Background: Laparotomy wound closure remains a critical determinant of postoperative outcomes. Two commonly used techniques are mass closure and layered closure, yet their relative advantages remain debated. This study compares the effectiveness of these two methods in terms of closure time, cost, and postoperative complications. **Methods:** A prospective randomized study was conducted in the Department of General Surgery, Sri Siddhartha Medical College, Tumkur, from March 2023 to September 2024. Sixty-four patients aged 20–70 years undergoing midline laparotomy were randomized into two groups: Group A (mass closure, n=32) and Group B (layered closure, n=32). Closure time, cost, and postoperative complications were recorded and patients were followed up for six months. **Results:** Mass closure was significantly faster, with most closures completed in 7–10 minutes, whereas layered closure required 11–20 minutes. The average cost of closure was lower in the mass closure group (Rs. 209.25) compared with the layered closure group (Rs. 295.20). Complications such as wound infection, seroma, and dehiscence were more frequent in the layered closure group, while hematoma incidence was slightly higher in the mass closure group. **Conclusion:** Mass closure is superior to layered closure with respect to operative time, cost, and overall complication profile. Adoption of mass closure for midline laparotomies may improve outcomes and reduce healthcare costs.

KEYWORDS

Abdominal surgery, Layered closure, Laparotomy, Mass closure, Wound complications

INTRODUCTION

Abdominal surgeries are among the most frequently performed procedures by general surgeons. The method of abdominal wall closure plays a pivotal role in patient recovery and long-term outcomes. The primary goals of closure include restoring the structural and functional integrity of the musculo-fascial system while minimizing complications such as wound dehiscence, infection, and incisional hernia.

Two widely adopted techniques are mass closure, which involves a single continuous layer incorporating all layers except skin and subcutaneous tissue, and layered closure, which approximates individual layers separately. The choice of technique continues to be debated, with mass closure hypothesized to offer advantages of reduced operative time, lower cost, and fewer complications. However, layered closure is still practiced in many settings. This study was undertaken to provide comparative data on these two techniques in a tertiary care setting.

MATERIALS AND METHODS

This was a prospective randomized study conducted in the Department of General Surgery, Sri Siddhartha Medical College, Tumkur, over 18 months (March 2023 – September 2024). A total of 64 patients aged between 20- and 70-years undergoing midline laparotomy were included. Patients were randomized into two equal groups: Group A (mass closure, n=32) and Group B (layered closure, n=32) using Sequentially Numbered, Opaque, Sealed Envelope (SNOSE) technique.

Inclusion Criteria

- Patients aged 20–70 years
- Patient who underwent elective or emergency laparotomy with midline incision

Exclusion Criteria

- Patients with diabetes mellitus, HIV or HBsAg positivity, malignancy, ongoing chemo/radiotherapy, chronic steroid use, or immunocompromised states.

Closure time was recorded for each patient. Wounds were examined on postoperative days 2, 3, 5, 7, and at suture removal. Complications such as infection, seroma, hematoma, and dehiscence were documented. Patients were followed monthly for 6 months for scar complications and incisional hernia.

RESULTS

Table 1: Time Taken For Abdominal Closure

Group	Mean closure time (min)
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Mass closure (A)	8
Layered closure (B)	15

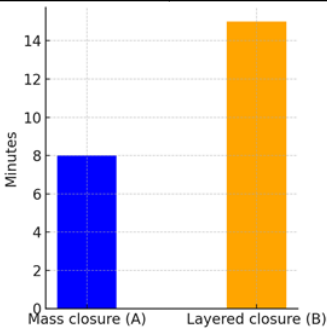


Figure 1: Comparison of mean closure time between mass and layered closure groups.

Table 2: Cost Of Abdominal Closure

Group	Mean cost (Rs)
Mass closure (A)	209.25
Layered closure (B)	295.2

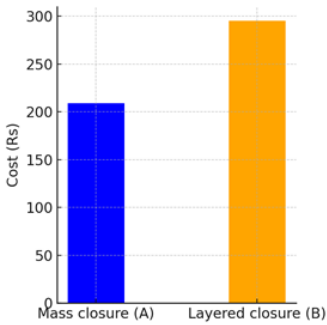


Figure 2: Comparison of average cost of abdominal closure between groups.

Table 3: Postoperative Complications

Complication	Mass closure (A)	Layered closure (B)
Wound infection	2	5
Seroma	1	3
Hematoma	2	1
Dehiscence	1	4

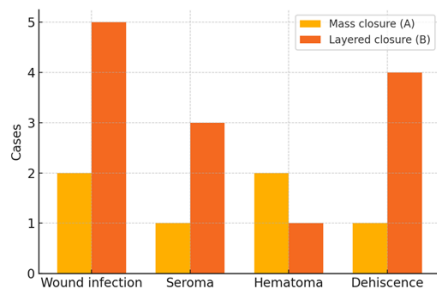


Figure 3: Comparison of postoperative complications among mass closure and layered closure groups.

DISCUSSION

This prospective randomized study demonstrates that mass closure of laparotomy wounds offers significant advantages over layered closure. Operative time was reduced with mass closure, as the technique involves fewer suturing steps. Reduced time not only improves efficiency but also decreases anesthesia exposure.

Mass closure was also found to be more cost-effective. With fewer sutures required and reduced operative time, the financial burden was substantially lower compared to layered closure. This finding has relevance in resource-constrained settings.

Complications were overall fewer in the mass closure group, with lower rates of wound infection and dehiscence. Layered closure showed higher complication rates, possibly due to increased tissue handling and ischemia caused by multiple suture lines. Hematoma, however, was slightly more common in the mass closure group, which may be attributed to less meticulous hemostasis.

Our findings are consistent with earlier studies such as those by Chowdhury et al. and Israelsson & Jonsson, who reported lower complication rates and reduced incisional hernia with mass closure. However, limitations of this study include a relatively small sample size and short follow-up period of six months. Long-term outcomes such as incisional hernia need further evaluation.

CONCLUSION

Mass closure of laparotomy wounds is superior to layered closure with respect to operative time, cost-effectiveness, and postoperative complications. It should be preferred as the standard technique for midline laparotomy incisions, particularly in elderly patients and resource-limited environments. Future large-scale studies with longer follow-up are warranted to confirm its benefits in preventing incisional hernia.

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